

INSECT BARRIER

The present invention relates to catch basin covers and in particular to insect barriers.

BACKGROUND OF THE INVENTION

[0001] Insect screening has long served to protect humans from insects. Insect screen framing has been widely used to provide a rigid structural frame to mount insect screening, allowing for the integration of insect screening into a variety applications. The most popular has been window applications.

[0002] A known refuge for insect population is a catch basin, some of which are located close to residential housing. There are available screening devices for screening debris (such as leaves) from entering the catch basin. However, these devices may not restrict insects from entering the catch basin and breeding new insect populations, nor may the devices suitably restrict emergence of these new insect populations from the catch basin and into the surrounding residential community.

[0003] Application of existing insect screen barriers to catch basins is discouraged due to the relatively thick profile of the screen framing, which interferes with placement and height of grate covers over the catch basin. A further impediment to using existing insect screen barriers is that they are not adjustable in peripheral dimension so as to accommodate a variety of catch basin sizes and shapes.

[0004] It is an object of the present invention to provide an insect barrier to obviate or mitigate at least some of the above presented disadvantages.

SUMMARY OF THE INVENTION

[0005] Existing insect screen barriers are not generally applicable to coverage of catch basins due to the relatively thick profile of the screen framing, which can interfere with placement of grate covers over the catch basin once the screen barrier is installed. Further, existing insect screen barriers may not be variable in peripheral dimension so as to accommodate a variety of catch basin sizes and shapes. One solution is to provide an insect barrier that is variable in peripheral dimensions, and can be adapted for installation into a catch basin opening having a

ledge to support a grate cover. The frame of the barrier consists of substantially planar corner members and side members, each having respective channel portions. The longitudinal lengths of the members are variable. The corner member is comprised of two female connectors, which have an inner and outer folded tab. The side member is comprised of two male connectors having flanges for interfacing with the tabs of the corner members. The male connector of the side member is placed into the female connector of the corner member, during assembly of the closed frame to define an opening. The inner and outer folded tabs of the female connector can be compressed into the flanges of the side member to secure, via friction, the connection between corner and side members. The assembled frame is completed such that adjacent respective channel portions abut to form a continuous channel. A mesh screen is installed in the channel to inhibit ingress and egress of insects through the opening of the closed frame. The assembled insect barrier is installed by placing it onto the support ledge of the catch basin grate cover.

[0006] According to the present invention there is provided a barrier of variable dimensions configured for inhibiting an ingress and egress of insects with respect to an adjacent entrance. The barrier comprises: a substantially planar closed frame including a plurality of interconnecting members for defining a central opening, at least some of the members configured for adjustment in length to conform the peripheral dimension of the assembled frame to those of the adjacent entrance; a first member of the plurality of interconnecting members having a base and a pair of tabs extending from the base to provide a female connector; a second member of the plurality of interconnecting members having a pair of flanges providing a male connector configured for being received by the female connector, the pair of flanges for overlapping with the pair of tabs of an adjacent said first member for coupling said first member and the second member to one another; a plurality of respective channel portions attached to at least some of the members, the channel portions configured for providing a continuous channel extending around the closed frame once assembled; and an insect screen configured for attachment to the continuous channel for covering the, defined opening of the closed frame.

[0007] According to a further aspect of the present invention there is provided a kit for providing a barrier of variable dimensions configurable to conform to the peripheral dimension

1 of an adjacent entrance. The kit comprises: a plurality of substantially planar members
2 configured for interconnection to form a substantially planar closed frame defining an opening,
3 at least some of the members being variable in length; at least one first member of the plurality
4 of members having a base and pair of tabs extending from the base to provide a female
5 connector; at least one second member of the plurality of members having a pair of flanges
6 providing a male connector configured for being received by the female connector, the pair of
7 flanges for interacting with the pair of tabs of an adjacent said first member for coupling the first
8 member and the second member to one another; a plurality of channel portions, each of the
9 channel portions attached to a respective one of the members, the channel portions configured
10 for providing a continuous channel extending around the closed frame once assembled. The
11 continuous channel is configured for attachment of an insect screen to cover the defined opening
12 of the closed frame, wherein the assembled said frame and said screen inhibit an ingress and
13 egress of insects when installed adjacent to the entrance.

15 **BRIEF DESCRIPTION OF THE DRAWINGS**

16 These and other features of the preferred embodiments of the invention will become more
17 apparent in the following detailed description in which reference is made to the appended
18 drawings wherein:

19 **[0008]** Fig. 1 is a top plan view of an insect barrier;

20 **[0009]** Fig. 2 is a perspective view of an installation of the barrier of Figure 1;

21 **[0010]** Fig. 3 is a bottom plan view of a frame of the barrier of Figure 1;

22 **[0011]** Fig. 4 is a top plan view of a corner member of the barrier of Figure 1;

23 **[0012]** Fig. 5 is a top plan view of a side member of the barrier of Figure 1;

24 **[0013]** Fig. 6 is a bottom perspective view of a decoupled corner and side member of the
25 barrier of Figure 1;

26 **[0014]** Figure 7 is an assembled view of the frame of Figure 1;

27 **[0015]** Fig. 8 is a bottom plan view of a frame of the barrier of Figure 1;

28 **[0016]** Fig. 9 is a bottom perspective view of a further embodiment of Figure 4;

29 **[0017]** Fig. 10 is a perspective top view of the of a corner member of Figure 9;

30 **[0018]** Fig. 11 is a perspective bottom view alternative embodiment of Figure 5;

[0019] Fig. 12 is a top perspective view of the side member of Figure 11;
[0020] Fig. 13 is a bottom perspective view of an alternative embodiment of Figure 6;
[0021] Fig. 14 is a perspective bottom view of coupled corner and side member of an assembled frame of Figure 13; and
[0022] Figure 15 is a perspective view of an installation of multiple barriers of Figure 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Referring to Figure 1, an insect barrier 10 includes a screen 12 attached to a frame 14. The screen 12 is composed of a fine mesh for inhibiting the movement of selected insects there-through, such as but not limited to mosquitoes. The frame 14 is composed of multiple sections, namely corner members 16 and side members 18, which are adjustable in length so as to match the external dimensions of the barrier 10 to an adjacent catch basin 20 (see Figure 2). Further, a grate cover 21 can be placed over the insect barrier 10 to protect the screen 12 and frame 14 from pedestrian or vehicular traffic.

[0024] Referring to Figure 3, with the screen 12 omitted for clarity, the frame 14 includes a continuous channel 22 for mounting the screen 12 thereto by such as but not limited to a flexible spline as is known in the art. The dimensions of the frame 14 are variable in length and width through user selection of the length of the side members 18, such as but not limited to by cutting or otherwise trimming of standard length side members 18. The frame 14 comprises four corner members 16 interconnected with four side members 18, joined together so as to form the frame 14 having a rectangular shape with a central opening 11. However it is recognised that other polygonal shapes of the insect barrier 10 can be provided, if desired, with an alternate number and shape of corresponding corner members and side members (not shown). Preferably, each corner member 16 is coupled to two adjacent side members 18 to assemble the frame 14. A set of tabs 24a,b are attached to each of the corner members 16 to assist in frictional engagement of the side members 18 once coupled with the corner members 16, as further described below, such that the members 16, 18 of the frame 14 remain coupled once assembled. For example, the corner members 16 can be substantially the same size and dimension with respect to one another, and any pair of opposing side members 18 can be approximately of similar length, as selected by

1 the user of the insect barrier 10 to accommodate the primary entrance 19 size of the
2 corresponding catch basin 20 (see Figure 2). It is also recognised that the tabs 24a,b could be
3 attached to the side members 18 with corresponding flanges 42a,b on the corner member 16, or a
4 combination thereof.

5
6 **[0025]** Referring to Figure 4, the corner member 16 includes a base 26, the outer folded tabs
7 24a and the inner folded tabs 24b, and a sidewall 28 there-between, such that the corner member
8 16 can be formed through folding from one piece of sheet material such as but not limited to
9 metals of steel and aluminum. The sidewall 28 can be located between two fold lines of the
10 corner member 16, or can be the region of a single fold line separating the base 26 from the tab
11 24a,b. The tabs 24a,b and the base 26 cooperate to form female connectors 30 on the distal ends
12 of the corner member 16, wherein the connectors 30 are sized to receive corresponding distal
13 ends or male connectors 32 of the side members 18 (see Figure 5). For example, referring to
14 Figures 4 and 5, a dimension X of the base 26 of the corner member 16 is slightly greater than a
15 dimension Y of the side member 18 to facilitate insertion of the male connectors 32 into the
16 female connectors 30. Further, a height H of the sidewall 28 is slightly less than a thickness T of
17 a base plate 40 of the side members 18, in order to assist in frictional engagement of the male
18 connectors 32 by the female connectors 30, once inserted therein. It should be noted in Figure 4
19 that the tabs 24a,b are positioned in a closed configuration with respect to the base 26.

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21 **[0026]** Referring again to Figure 4, a corner channel portion 34 composed of two channel 36
22 portions, of the continuous channel 22 (see Figure 3) is affixed to the base 26. The corner
23 channel 34 is located at the approximate intersection of lines A-A, such that the corner channel
24 34 will be in approximate alignment with a side channel portion 36 of the side member 18 (see
25 Figure 5) once the frame 14 is assembled. The entrance of the corner channel 34 is directed
26 inwards toward a center 13 (see Figure 1) of the insect barrier 10, and comprises of, but not
27 limited to a generally right angled channel that can be affixed to a base plate 38 that is attached
28 to the base 26. The base plate 38 elevates the right angled corner channel 34 by the thickness T
29 such that the corner channel 34 is vertically aligned with the side channel 36, once the corner
30 members 16 are joined to the side members 18 to assemble the frame 14, to facilitate formation

1 of the continuous channel 22. It is noted that the dimensions of the base plate 38 may vary, or
2 the base plate 38 may be removed from the corner member 16, so long at the elevation of the
3 corner channel 34 is approximately aligned vertically with the side channel 36 of the side
4 member 18.

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6 **[0027]** Referring to Figure 5 the side member 18 has the side channel 36 connected to the
7 base plate 40, which comprises an inner flange 42a located on the same side as the entrance of
8 the side channel 36 and an outer flange 42b located on the other side. The flanges 42a,b define
9 each male connector 32 of the side member 18, and are dimensioned in width and thickness so as
10 to be compatible with the corresponding inner tabs 24a and outer tabs 24b of the female
11 connectors 30. The side channel 36 is positioned somewhat centrally on the base plate 40, so as
12 to not interfere with insertion of the male connector 32 into the corresponding female connector
13 30 during assembly of the frame 14. The entrance of the side channel 36 is directed inwards
14 toward the center 13 (see Figure 1) of the insect barrier 10, and comprises of, but not limited to a
15 generally right angled channel that is affixed to the base plate 40. It is recognized that other
16 angles than 90° can be used if desired. The side channel 36 can either be formed separately from
17 the base plate 40 and then attached through chemical and/or mechanical fastening and methods
18 (not shown), or the side channel 36 and base plate 40 can be formed through folding from one
19 piece of sheet material.

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21 **[0028]** In assembly of the insect barrier 10, referring to Figures 6 and 7, the tabs 24a,b of the
22 female connectors 30 are placed in an open configuration so as to receive the flanges 42a,b of the
23 corresponding male connectors 32 (see Figure 6), in order to facilitate the initial insertion of the
24 male connectors 32 (see Figure 5) into the female connectors 30. The length of the side
25 members 18 is determined by the user and then the appropriately sized side members 18 are
26 inserted into the corner members 16 until the ends of the adjacent corner channels 34 and side
27 channels 36 are in abutment, thus providing the continuous channel 22 (see Figure 1) extending
28 around the frame 14 of the insect barrier 10. Once inserted, the side members 18 are secured to
29 the corner members 16 by employing at least frictional engagement of the tabs 24a,b and
30 adjacent flanges 42a,b, i.e. where the material of the side members 18 and corner members 16

1 overlap, so as to place the tabs 24a,b in a closed configuration as shown in Figure 7. This
2 frictional securing of the corner members 16 to the adjacent side members 18 is done by
3 compressing the material of the tabs 24a,b of the female connector 30 toward the flanges 42a,b
4 of the male connector 32, as indicated by arrow 31. The degree of frictional engagement is such
5 that the resultant frictional coupling between the corner members 16 and side members 18 would
6 discourage separation thereof once the frame 14 is assembled.

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8 **[0029]** It is recognised that other alternatives to augment securing of the corner members 16
9 to the adjacent side members 18 can include: changing the geometrical relationship of the female
10 connector 30 and the side member 18 by crimping together the overlapping material of the tabs
11 24a,b and flanges 42a,b by a crimping tool (not shown), either in whole or in part; and/or using
12 fasteners such as but not limited to bolts, rivets, nails, staples, and adhesives or welding the
13 overlapping material of the tabs 24a,b and flanges 42a,b. Further, raised modular (not shown) on
14 the tabs 24a,b can be used to provided a textured tab surface for contact with the corresponding
15 flanges 42a,b, thus promoting the frictional engagement.

16
17 **[0030]** Referring to Figure 8, once the frame 14 of the insect barrier 10 has been assembled
18 and the members 16, 18 have been secured to one another, the open continuous channel 22 is
19 used to secure the insect screen 12 by first placing the insect screen 12 into the entrance of the
20 channel 22 and then inserting the flexible spline into the entrance of the channel 22. The screen
21 12 is then secured to the frame 14 between the inner surface of the channel 22 and the outer
22 surface of the spline. The spline can be made of resilient material, such as but not limited to
23 rubber, in order to inhibit the insect screen 12 from becoming detached from the channel 22 once
24 secured therein. It is also recognised that the screen 12 could be bonded to the periphery of the
25 channel 22 by a suitable adhesive (not shown). It is noted that the entrance of the continuous
26 channel 22 is directed towards the center 13 (see Figure 1) of the frame 14, so as to inhibit failure
27 of the screen 12 through contact with an edge 23 (see Figure 4) of the channel 22 during
28 assembly. Accordingly, the channel 22 and attached screen 12 cooperate to seal the opening 11
29 (see Figure 3) of the frame 14, such that insects are inhibited from moving from one side of the
30 frame 14 to the other once the assembled insect barrier 10 is mounted in the catch basin 20 (see

Figure 2). It is noted that the tabs 24a,b contact the corresponding flanges 42a,b to maintain the frame 14 in assembled form.

[0031] Referring again to Figure 2, the dimensions of the assembled frame 14 are user selected such that the insect barrier 10 can be integrated into the correspondingly sized catch basin 20. The insect screen barrier 10 can be installed into the catch basin 20 by placing the marginal edge (e.g. between the outer perimeter of the frame 14 and the outer perimeter of the continuous channel 22) onto a ledge 44 of the catch basin 20, whereby the ledge 44 bears the distributed weight of the insect barrier 10 when the marginal edge is placed flat against the ledge 44 of the basin 20. Further, a resilient sealing strip 46 can be inserted between the marginal edge of the frame 14 and the ledge 44 to help account for any inconsistencies of the ledge 44 surface, such as but not limited to spalled concrete or unlevel surfaces, which would otherwise allow the ingress or egress of insects between the insect barrier 10 and the ledge 44. The material of the strip 46 can be composed of such as but not limited to caulking, rubber, or foam. Further, the strip 46 can be either loosely positioned between the insect barrier 10 and the ledge 44, or bonded to the ledge 44, insect barrier 10, or both, if desired. Accordingly, the insect barrier 10 utilizes the variable sized frame 14 for positioning the continuous channel 22 and attached screen 12 over the hole 19 to inhibit the ingress or egress of insects with respect to the catch basin 20. Further, it is recognized that the material of the frame 14 between the ledge 44 and the continuous channel 22 is resistant to insect penetration in order to provide an integral barrier to insects where the insect barrier 10 covers the hole 19 of the catch basin 20.

[0032] Referring to Figures 9 and 10, an insect barrier 110 includes (a portion shown for convenience) a corner member 116 having a base 126, sidewall 128, and tabs 124a,b. It is noted that a corner channel portion 134, composed of two channel portions 136, is provided as an extension of the tab 124b, such that the corner member 116 (including the channel 134) can be formed through folding one piece of sheet material. The base 126 and tabs 124a,b form a female connector 130 as noted above for the insect barrier 10. A sheet member or key 100 provides corresponding male connectors 132 on either side for insertion into the female connector 130 of the corner member 116. Coupling of the key 100 and the corner member 116 can be done as

discussed above with respect to the insect barrier 10. It is further recognized that the key 100 may be part of the base 126 of the corner member 116, rather than connected via the female connector 130.

[0033] Referring to Figures 11 and 12, a side member 118 of the barrier 110 includes the base 140, sidewall 128, and tabs 124a,b similar to the corner member 116. Further, it is recognized that a side channel portion 136 with an edge 123 is provided as an extension of the tab 124b, such that the side member 118 (including the channel 136) can be formed through folding one piece of sheet material. The base 126 and tabs 124a,b form the female connector 130, dimensioned so as to accommodate receiving one of the male connectors 132 of the key 100 (see Figure 9).

[0034] Referring to Figure 13, assembly of the insect barrier 110 (a portion shown for convenience) uses the male connectors 132 of the key 100 to secure adjacent female connectors 130 of corresponding corner members 116 and side members 118. As noted with the insect screen 10, the corresponding corner channel 134 and adjacent side channel 136 are positioned in abutment with one another to form a continuous channel 122 there-between (see Figure 14). It is recognised that alternatively, any combination of male connectors 132 and female connectors 130 can be positioned on the corner members 116 and side members 118 as long as the continuous channel 122 is provided once the frame 114 is assembled. As discussed above in relation to the insect barrier 10, the screen is fastened to the channel 122 of the insect barrier 110. Further, it is recognized that the connection between abutting adjacent ends of the channel portions 136 of the corner channel portion 134 can be reinforced by overlapping and fastening the adjacent ends, or by fastening a separate plate overlapping the abutment of the two channel portions 136. Reinforcement between adjacent channel portions 136 of the side members 118 and corner members 116 can also be employed, if desired. The reinforcement could also be used for the barrier 10 (see Figure 3), if desired.

[0035] Accordingly, the insect barrier 10, 110 provides a relatively planar framed structure for fitting between the ledge 44 of the catch basin 20 and the grate cover 21, so as to minimise the vertical displacement of the cover 21 so as to inhibit interference with pedestrian traffic.

1 Further, it is recognized that the barrier 10, 110 can be supplied in a kit form for subsequent
2 assembly by a user, or can be supplied assembled with instructions on varying the dimensions of
3 the frame 14. Further, referring to Figure 15, multiple adjacent barriers 10, 110 can be
4 positioned in an oversized catch basin 20 to effectively cover the hole 19 by the series of barriers
5 10, 110, such that ingress and egress of insects is discouraged.

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7 **[0036]** Although the invention has been described with reference to certain specific
8 embodiments, various modifications thereof will be apparent to those skilled in the art without
9 departing from the spirit and scope of the invention as outlined in the claims appended hereto.